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Use of Plasma Exchange in Hereditary Deficiency of Factor V and Factor VIII

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Combined hereditary deficiency of coagulation factors V and VIII is a very rare bleeding disorder. The severity of bleeding is determined by the level of these factors, although in general, this is less striking than the severe deficiency of either factor alone. We describe in this article a patient with this congenital defect, and the preoperative management for major surgery. © 1996 Wiley-Liss, Inc.

Key words: hereditary deficiency of factor V and factor VIII, plasma exchange, bleeding

INTRODUCTION

Six types of combined hereditary deficiency of coagulation factors, or otherwise called; familial multiple factors deficiency (FMFD), have been reported to date [1,2]. We present in this report a patient with combined deficiency of factors V and VIII (FMFD type I). This syndrome has been described in at least 26 families. The mode of inheritance is most likely autosomal recessive [3,4]. The origin of most of these families is the Mediterranean basin. It was initially proposed that a decrease in the activity of an inhibitor to activated protein c (which inactivates inactivated FV and FVIII) was responsible for the deficiency state, but it was found later that these patients had normal levels of this inhibitor [5–7]. Since FV and FVIII genes are located on separate chromosomes, a single gene defect may account for the deficiency of both factors. Recombinant FVIII infusion, and plasma exchange were used prophylactically to achieve adequate hemostatic levels in preparation for cardiac surgery in this patient.

CASE REPORT

Fifty-five-year-old white male with a history of combined Factor V and Factor VIII deficiency (baseline F.V and F.VIII activity were 11–14 and 6–11%, respectively), who presented with 6 months history of exertional substernal chest pain relieved by nitroglycerin. The patient was admitted for diagnostic cardiac catheterization to rule out cardiac etiology of his chest pain. Factor V and Factor VIII activity at admission were 4 and 10%, respectively. Prior to the procedure, the patient received DDAVP 0.3 mcg/kg and fresh frozen plasma (FFP). Factor V and Factor VIII activity post-DDAVP and FFP were 10 and 21%, respectively. The patient developed severe chest pain and shortness of breath during FFP administration. This was stopped, and the next day the patient underwent cardiac catheterization which showed severe 3 vessel coronary artery disease. During the procedure, he had unstable angina which necessitated insertion of intraaortic balloon pump, and a coronary artery bypass grafting surgery was planned. In anticipation for the operation, he underwent transfusion with FFP to correct his coagulopathy, but subsequently developed pulmonary edema. Due to this volume overload and poor response to DDAVP, plasma exchange and recombinant factor VIII concentrate 40 U/kg followed by 200 U/hr continuous intravenous infusion were given in order to achieve hemostatic levels before surgery. His factor V and factor VIII level was maintained at 64 and 117%, respectively, during surgery. There were no bleeding complications during or after the surgery. The patient received another plasma exchange following the surgery, and then he was maintained on FFP infusion of 1 U every 12 h for another 2 days. He finally was discharged without complication.

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MATERIALS AND METHODS

Venous blood for coagulation tests was collected in 3.2% sodium citrate solution with a blood:anticoagulant ratio of 9:1. Platelet poor plasma was obtained by centrifugation at 2,000*g* for 10 min. The activated partial thromboplastin (aPTT) and prothrombin time (PT) were performed on the Organon Teknika MDA-180 using rabbit brain partial thromboplastin (Platelin L, Organon Teknika, Durham, NC) and rabbit brain thromboplastin (Simplastin L, Organon Teknika, Durham, NC), respectively. Factor V and factor VIII activity were measured by the modified one-stage aPTT assay using frozen congenitally-deficient plasma (HRF Incorporated, Raleigh, NC).

DISCUSSION

Combined hereditary deficiency of factors V and VIII is a rare bleeding diathesis. Family studies suggest that an autosomal recessive pattern may be the mode of inheritance. Most of the patients described have mild to moderate bleeding manifestations. The levels required for adequate hemostasis are not well defined, although, in our experience an activity of 20–25% for both factors should be sufficient to control bleeding episodes in these patients and this can be achieved by plasma infusion, and DDAVP or FVIII concentrate as a source of FV and FVIII, respectively. Our patient did not tolerate plasma infusion, and we felt that for this major surgery an activity of 40% or above for FV would be desirable. To achieve this level large amounts of plasma need to be infused, therefore plasma exchange was successfully elected and used. Clinicians may consider this procedure as an alternative option to plasma infusion if an activity level of 30–40% is thought to be preferable in a specific case, or if plasma infusion is contraindicated. To our knowledge this is a unique case of combined deficiency of factors V and VIII where plasma exchange is used as a prophylactic measure.

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